

REMARKS

Applicants have to emphasize that one feature of the present invention lies in that a thin and heavily doped n⁺-type reverse-tunneling layer 20 is provided between a transparent ohmic contact electrode, e.g. made of ITO, and a semiconductor LED stack. The tunneling effect provided by the reverse-tunneling layer 20 lets a good ohmic contact be formed between the transparent ohmic contact electrode and the semiconductor LED stack (Please refer to paragraph [0013], page 3 of the specification).

The Examiner alleges that Watanabe et al discloses on figure 1 an n⁺ type reverse tunneling layer 7 positioned on the p type contact layer 6. Nevertheless, the current blocking layer 7, as described on lines 26-29, col. 6, Watanabe Patent, is a nonconductor layer and therefore cannot be considered as a reverse-tunneling layer that provides tunneling effect and has to be conductive in the bias direction of the LED stack.

Each of the amended independent claims 1, 4, and the original independent claim 5 comprises a reverse-tunneling layer that is not suggested or taught in any prior art cited by the examiner. Therefore all the claims 1 to 7 are in condition of allowance.

Reconsideration of the rejection over claims 1 to 7 is therefore respectfully requested.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

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CLAIMS

What is claimed is:

1. (Amended) A light emitting diode comprising:
 - 10 an insulating substrate;
 - a semiconductor ~~multi-layer stack~~ positioned ~~on over~~ the insulating substrate, the semiconductor ~~multi-layer stack~~ comprising a first surface and a second surface, a distance between the first surface and the insulating substrate is greater than a distance between the second surface and the insulating substrate;
 - a reverse-tunneling layer over the first surface;
 - a first transparent ohmic contact electrode
 - 20 positioned directly on the reverse-tunneling layer ~~first surface~~; and
 - a second transparent ohmic contact electrode positioned ~~on over~~ the second surface;
 - ~~wherein the first transparent ohmic contact electrode and the second transparent ohmic contact electrode comprise the same materials.~~
2. (Amended) The light emitting diode of claim 1,
 - 30 wherein the insulating substrate comprises sapphire, and the first transparent ohmic contact electrode and the second transparent ohmic contact electrode comprise the same material.

3. (Amended) The light emitting diode of claim 1,
wherein the first transparent ohmic contact
electrode ~~and or the second transparent ohmic~~
5 ~~contact electrode are made of~~ comprises at least one
selected from a group comprising indium tin oxide
(ITO), cadmium tin oxide (CTO), and
titanium-tungsten nitride (TiWN).

10 4. (Amended) A light emitting diode comprising:
a substrate;
a semiconductor stack positioned over the
substrate;
a reverse-tunneling layer over the semiconductor
15 stack; and
an ohmic contact electrode formed directly on the
reverse-tunneling layer. ~~A light emitting diode~~
~~comprising an insulating substrate, an n-type or~~
~~n⁺-type contact layer of gallium nitride (GaN) based~~
20 ~~compounds positioned on the insulating substrate, and~~
~~a transparent ohmic contact electrode positioned on~~
~~the contact layer, the transparent ohmic contact~~
~~electrode being made of at least one selected from a~~
~~group comprising indium tin oxide, cadmium tin oxide,~~
25 ~~and titanium tungsten nitride.~~

8. (New) The light emitting diode of claim 4, wherein
the ohmic contact electrode is a transparent ohmic
contact electrode.

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9. (New) The light emitting diode of claim 8, wherein
the transparent ohmic contact electrode is a

non-metal transparent ohmic contact electrode.

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Sincerely yours,

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